CLAIMS

1.   A method for virtually concatenating optical channels in WDM networks, the method comprising the steps of:

-       providing for à plurality of frames, each frame comprising a byte reserved for a concatenation flag;

-       writing the same value defined in advance into the n-frame (n=1,2,3,...) concatenation byte; and

-       transmitting the n frames through n respective channels.

2.   A method for receiving a number n of virtually concatenated signal frames in WDM networks, the method comprising the steps of:

-       receiving a first reference frame at an instant t_0;

-       reading the concatenation byte value of such reference frame;

-       receiving the remaining n-1 signal frames after a respective determined time t;

-       reading the concatenation byte value of the remaining n-1 signal frames; and

-       identifying and aligning all the signal frames with the same concatenation byte value compensating for the receiving time t.

3.   A method according to claim 2, wherein the step of aligning all the signal frames with the same concatenation byte value comprises the steps of:

-       receiving the remaining n-1 signal frames at corresponding instants t_1;

-       calculating, for each of the remaining n-1 frames, the time t elapsed from the instant at which the reference frame has been received;

-       providing, for every channel, an elastic store; and

-       holding steady the elastic storage of the reference channel and moving the others in dependence of the calculated times t.

4.   A method according to claim 2, wherein the step of receiving the remaining n-1 signal frames after a respective determined time t comprises the steps of:

-       reading the frame alignment word of the reference frame at a first instant t_0;

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- reading the frame alignment word of the remaining n-1 frames at corresponding second instants t_1; and

- calculating the time differences t between the first instant t_0 and the corresponding second instants t1.

5. A method according to any of claims 2 to 4, wherein the additional step is provided of calculating the possible differences between the concatenation byte value of the reference frame and the concatenation byte value of the remaining n-1 frames, multiplying such possible differences by the frame period T and adding the value obtained to the respective time differences t.

6. An apparatus for virtually concatenating optical channels in WDM networks, the apparatus comprising:

- a first circuit for writing the same predetermined value into the concatenation byte of n-signal frames (n=1,2,3,...) : and

- a transmitter of the n frames through n respective channels.

7. An apparatus for receiving a number n of signal frames virtually concatenated in WDM networks, the apparatus comprising:

- a first receiver of a first reference frame at an instant t_0;

- a first circuit for reading the concatenation byte value of such reference frame;

- a second receiver of the remaining n-1 signal frames after a respective determined time t;

- a second circuit for reading the concatenation byte value of the remaining n-1 frames; and

- a circuit for identifying and aligning all the signal frames with the same concatenation byte value compensating for the receiving times t.

8. A WDM network comprising circuits for the implementation of the method for virtually concatenating optical channels of claim 1.

9.   A WDM network comprising circuits for the implementation of the method for receiving a number n of virtually concatenated signal frames of claim 2.

10.   A WDM network comprising an apparatus for virtually concatenating optical channels as in claim 6.

11.   WDM network comprising an apparatus for receiving a number n of virtually concatenated signal frames as in claim 7.